WEATHER, FORECASTS, AND WARNINGS.

By EDWARD H. BOWIE, District Forecaster.

NORTHERN HEMISPHERE PRESSURE.

Alaska.—Pressure for the month was abnormally low for all stations, the greatest negative departure 0.49 inch being at Valdez which station also gave the lowest monthly mean, 29.321 inches. Pressure was below normal almost continuously, except at Sitka from the 5th to 10th and 19th to 22d; at Nome 17th to 25th, and at Dutch Harbor from the 20th to 24th. Lows occurred about the 2d–3d, 5th–6th, 8th, 12th–13th, 14th–15th, 22d–23d, 26th–27th and 30th; and highs about the 4th, 7th, 10th, 19th–20th, 24th–25th, and 28th. Severe gales accompanied by heavy snow prevailed from the 9th to 11th.

Honolulu.—Pressure averaged considerably above normal for the month, being below during the first decade, above during the second, and during the first half of the third about normal and the latter half above normal. Lows occurred on the 3d–4th, 19th and 24th; and highs on the 14th, 16th–17th, and 29th.

Iceland.—Pressure averaged much below normal, being continuously so from the 8th to 21st and 24th to 29th, the lowest pressure reported being 28.22 inches on the 13th. Lows occurred on the 5th, 8th–9th, 11th, 13th, 18th, 20th–21st, 24th–25th, 28th–29th, and the last day of the month; and highs on the 2d–3d, 7th, 22d–23d and 30th. A severe disturbance visited the British Isles and France on the 26th and 27th, causing a number of wrecks.

Azores.—Pressure averaged above normal for the month, being continuously above from the 7th to 17th and from the 28th to 31st. Lows occurred on the 2d, 6th, 19th and 26th–27th; and highs on the 4th, 7th–8th, 12th, 15th, 28th–29th and 31st.

Siberia.—Pressure was above normal, being generally high over all sections during the first decade, and during the second decade it was high to the north and low to the south. During the third decade pressure was high during the first half and low during the second half. Lows occurred about the 4th, 10th–11th, 26th–27th and 31st; and highs about the 5th–6th, 8th, 17th, 21st, 24th–25th and 29th. The progression of highs and lows across the Siberian area was not well defined.

Miscellaneous.—Severe storms were experienced over the trans-Atlantic steamer routes about the 1st, 14th to 21st and 26th and 27th.

In the United States at the beginning of the month a low-pressure area of moderate intensity was over eastern South Dakota and high pressure areas were central over Montana and northern New York, the latter being of more than moderate intensity. Storm warnings were ordered on the 1st for the Upper Lakes and Lake Erie and on the 2d for Ontario and the Atlantic coast from Cape Henry northward. High winds occurred over the districts indicated in the warnings. The low-pressure area advanced to Lower Michigan by the morning of the 2d, and during the 24 hours following had passed to Newfoundland. Precipitation was general in connection with this disturbance.

It was followed by a high-pressure area that advanced from Montana to the eastern Plains States by the morning of the 2d. On the morning of the 1st cold wave warnings were ordered for the Plains States and decided falls in temperature occurred by the morning of the 2d over that region. By the morning of the 3d the high pressure area was over the Atlantic seaboard. On the morning of the 5th, following the passage of this high pressure to the Atlantic Ocean, a number of stations along the coast from Norfolk to Jacksonville reported the occurrence of dense fogs.

From the 2d to the 5th, a low advanced over a northern course from British Columbia to the Grand Banks, precipitation attending this storm being inconsequent.

It was followed by another low that appeared over British Columbia on the 3d and advanced to western North Dakota by the following morning, causing heavy snows over Colorado, Wyoming, Nebraska, and the Dakotas and consequent delays to railway traffic. By the morning of the 5th it was central over northeastern Missouri, when storm warnings were ordered for the Great Lakes, and with the northeastward advance of the storm to eastern Ontario during the following day, gales occurred over the Great Lakes, causing the loss of several vessels. By the morning of the 7th, it was over the Grand Banks with increased intensity, as indicated by a pressure reading of 29.22 inches near its center. While the storm was over Ontario on the 5th, storm warnings were ordered for the Atlantic coast from Delaware Breakwater to Eastport and brisk to high winds were reported during the latter part of that day. Precipitation was general from the Mississippi Valley eastward.

No high-pressure area of consequence followed this low, although pressure rose to considerably above normal from the Pacific coast to the southern Slope districts. Cold-wave warnings were ordered on the 4th for eastern Montana, the Dakotas, and western Minnesota and decided falls in temperature followed over those States.

The next low of consequence moved from Alberta on the morning of the 6th to eastern North Dakota in the 24 hours following and storm warnings were ordered for the Great Lakes. During the next 24 hours, attending the advance of the disturbance to eastern Quebec, gales occurred as indicated in the warnings, and during the night of the 8th storm winds were experienced from Sandy Hook to Eastport, warning of which had been previously issued. On the morning of the 9th the storm was east of Nova Scotia. Precipitation attending this disturbance was slight.

Following the passage of this low cold wave warnings were ordered during the 7th from New England to the

Plains States and as far south as Kentucky, and sweeping changes to colder weather overspread the country indicated during the next 48 hours. A high-pressure area advanced from Alberta on the evening of the 7th to Kansas by the following evening, and thence passed across the Gulf States during the 9th and 10th, causing heavy frosts near the Alabama and northwestern Florida coasts and in extreme southern Georgia, warnings of which had been previously issued.

The next low advanced from Saskatchewan to Lake Superior by the morning of the 10th. Storm warnings were ordered on the 9th for the Great Lakes and dangerous gales followed over the region indicated, being particularly severe on Lake Erie. On the 10th storm warnings were also ordered for the Atlantic coast from Sandy Hook northward and brisk to high winds occurred along the coast, attending the passage of the storm to eastern Quebec by the morning of the 11th, where it persisted for several days. Precipitation was fairly general over the northern States east of the Mississippi River, particularly in northern New York, where heavy snows were reported. During the 9th and 10th showers were well distributed in the Gulf States in connection with a disturbance that decreased in intensity and lost its identity over the Gulf of Mexico.

A high-pressure area appeared over Saskatchewan on the 10th and the cold-wave warnings issued for the Plains States were later justified. By the morning of the 12th it was over Missouri and during the next 48 hours moved to Georgia and thence passed off the coast with decreased intensity.

A disturbance that appeared over Saskatchewan on the 14th passed along a northern route to Newfoundland by the 17th, where it showed with increased intensity. Precipitation was light and confined generally to the Lake region and New England.

A high-pressure area of slight intensity advanced from the Rocky Mountain region on the 15th to the Atlantic coast during the next 48 hours and, following its passage to the ocean on the 18th, heavy fog was reported from portions of the South Atlantic States.

A low-pressure area that first made its appearance on the Oregon coast on the evening of the 15th was central over British Columbia on the morning of the 16th, having in the meantime sent an offshoot to western Kansas. This offshoot became the principal storm and by the morning of the 17th had advanced with increasing intensity to southern Minnesota, causing unusually heavy snows in portions of Wisconsin. By the morning of the 18th there were two centers, one over lower Michigan and the other over Tennessee, and on the evening of this day storm warnings were ordered for the Atlantic coast from Delaware Breakwater northward. On the 19th the northern storm center was over extreme northern New York, while the southern center had advanced to a position near Nantucket. On the evening of that date there remained but one center near Father Point, with a pressure reading of 28.78 inches. Gales were reported from New York northward, and the storm persisted over the Canadian Maritime Provinces until the 22d. Precipitation was general from the Plains States eastward in northern districts and scattered over southern.

On the 17th the Pacific high-pressure area had overspread the middle Pacific coast, and on the following morning an offshoot from it was over southwestern Colorado. By the morning of the 19th it had passed to the middle Gulf States, causing frosts at a number of stations along the coast, warnings of which had been previously issued. By the morning of the 20th it was over northern Florida, having caused heavy to killing frosts in the extreme northern part of that State and light frost over the central portion. On the 17th storm warnings were issued for the north Pacific coast and destructive gales occurred over that region in connection with a low-pressure area that advanced from Alberta on the 18th to North Dakota on the 19th. It passed thence to lower Michigan and thereafter lost its identity. Precipitation in the form of snow occurred from the northern Plains States to the Lake region.

Pressure remained high on the Pacific coast from the 17th to 19th, on which latter date it became high over the middle Rocky Mountain region and on the following morning a high-pressure area was central over the middle Mississippi Valley. During the two days following it advanced to the middle Atlantic coast.

Precipitation began over the west Gulf States on the 21st following a slight pressure fall over that region, and snow was reported from Oklahoma, New Mexico, and the Texas Panhandle. By the following morning there were indications of a low development off the Texas coast, the precipitation area in the meantime having spread to the South Atlantic States. A well-marked center was over Louisiana on the 23d, and by the evening of that date it was over Alabama. Storm warnings were ordered for the Atlantic coast from Wilmington northward to Boston, and on the morning following when the storm was off the Virginia coast the orders were extended to Eastport. The storm advanced rapidly northeastward to the Canadian Maritime Provinces and, although only a few coast stations reported verifying velocities, vessel reports indicate that the storm was severe off the coast. Several wrecks due to collision were reported along the north Atlantic coast, being probably due to the heavy snow, together with the high winds. Precipitation was general from the Gulf States to New England, being heavy in parts of the Gulf States. Falls of snow of 10 inches or more occurred in the Appalachian region and thence northeastward along the coast to southern New England.

A high-pressure area advanced from the middle Plateau region on the 23d to the west Gulf States by the 24th, causing frosts in the vicinity of Corpus Christi, and freezing temperatures over Louisiana and Texas, warnings of which were issued on the previous day. The high passed to the Middle Atlantic States during the next 24 hours, where it persisted for another day before passing northeastward over the ocean. On the 25th frosts occurred in extreme northern Florida and southern Alabama, for which warnings were issued on the 24th.

Another disturbance passed from Saskatchewan on the 22d to Lake Huron on the 24th. It was central over extreme northern New York on the following morning, but was not thereafter traceable on the weather charts, although it probably aided the development of the storm that advanced from the Virginia coast to the Canadian Maritime Provinces during the 24th and 25th. Precipitation in connection with this disturbance was unimportant.

The next disturbance passed from Saskatchewan on the 24th to Ontario on the 25th, with a second center in its trough over eastern Colorado. By the 26th the northern center was over eastern Ontario, while the southern center was apparently over southern Texas. On the

evening of that date there were some slight indications of a development off the south Atlantic coast and by the morning of the 27th there was a low center off the New Jersey coast, with pressure readings at Atlantic City and New York of 29.52 inches, while to the northward near Lake Ontario was the remainder of the northern storm that on the previous morning was over eastern Ontario. Storm warnings were issued on the afternoon of the 26th for the Atlantic coast from Savannah to Hatteras and on the morning of the 27th extended northward to Eastport. High winds occurred over the south Atlantic coast on the 27th and on the middle Atlantic and New England coasts on the 28th. By the morning of the 28th the Atlantic coast storm was central over the Canadian Maritime Provinces, with the lowest reported barometer reading 28.22 inches at Sydney, Nova Scotia. Precipitation was general from the Mississippi Valley eastward, being in the form of snow over northern and rain over southern districts.

A high area appeared on the middle Pacific coast on the 25th and on the following morning it was over the middle Plateau region. During the 48 hours following it overspread the Gulf States, causing heavy frosts at a number of points along the immediate Gulf coast, warnings of which had been previously disseminated. By the morning of the 29th it was over eastern North Carolina.

Following the passage of this high to the Gulf States on the 28th, a low pressure area developed over the Rocky Mountain region and by the following morning was central over northeastern Kansas. On the 30th its center was northeast of Lake Superior and storm warnings were ordered for the Middle Atlantic and New England coasts and high winds followed over the region from Hatteras northward. On the 31st it was over the Canadian Maritime Provinces with increased intensity. Rain from this storm was general east of the Mississippi River.

A low-pressure area passed inland over the extreme north Pacific coast during the 29th and on the last day of the month it was over Ontario, no precipitation of importance having occurred within the area of its influence.

On the last day of the month another low passed inland over the north Pacific coast and was central over Saskatchewan.

Pressure on the California coast remained almost continuously high during the last half of the month.

RIVERS AND FLOODS, DECEMBER, 1912.

Prof. ALFRED J. HENRY, in Charge River and Flood Division.

As in the preceding months of September, October, and November, fluctuations in river heights throughout the United States were small and unimportant, except in the rivers of southeastern Mississippi, viz, the Pearl and Pascagoula. Heavy local rains in the State of Misisippi caused the Pearl River to exceed the flood stage in the lower part of its course from the 9th to the 15th and again on the 28th. The Pascagoula was near a flood stage on the 10th and at flood stage on the 28th. The loss of property was small, probably not more than $1,000, in live stock in the lowlands of the Pascagoula.

Hydrographs for typical points on several principal rivers are shown on Chart I. The stations elected for charting are Keokuk, St. Louis, Memphis, Vicksburg, and New Orleans, on the Mississippi; Cincinnati and Cairo, on the Ohio; Nashville, on the Cumberland; Johnsonville, on the Tennessee; Kansas City, on the Missouri; Little Rock, on the Arkansas; and Shreveport, on the Red.

Average temperatures and departures from the normal.

Districts.	Number of stations.	Average temperatures for the current month.	Departures for the current month.	Accumulated departures since Jan. 1.	Average departures since Jan. 1.
New England	11	34.6	+5.5	− 0.4	0.0
Middle Atlantic	15	39.2	+4.2	− 1.9	−0.2
South Atlantic	10	50.4	+3.2	+ 2.3	+0.2
Florida Peninsula [1]	9	65.3	+4.5	+ 3.6	+0.3
East Gulf	11	50.3	+1.2	− 6.9	−0.6
West Gulf	11	47.4	−1.7	−11.3	−0.9
Ohio Valley and Tennessee	14	37.5	+0.8	−15.0	−1.2
Lower Lakes	11	32.9	+3.8	−18.0	−1.5
Upper Lakes	13	28.0	+3.5	−18.0	−1.5
North Dakota [1]	9	17.8	+4.1	− 5.3	−0.4
Upper Mississippi Valley	14	31.8	+4.5	−13.9	−1.2
Missouri Valley	12	32.2	+5.3	− 3.2	−0.3
Northern slope	9	27.0	+3.3	−12.3	−1.0
Middle slope	6	34.5	+1.6	−15.2	−1.3
Southern slope [1]	8	38.3	−2.7	−12.3	−1.0
Southern Plateau [1]	10	37.3	−4.3	−17.2	−1.4
Middle Plateau [1]	10	24.6	−2.6	−17.5	−1.5
Northern Plateau [1]	9	30.3	+0.9	− 9.5	−0.8
North Pacific	7	41.8	−0.2	+ 7.4	+0.6
Middle Pacific	7	47.8	−0.6	− 3.5	−0.3
South Pacific	4	51.8	−1.1	+ 4.3	+0.4

[1] Regular Weather Bureau and selected cooperative stations.

Average precipitation and departure from the normal.

Districts.	Number of stations.	Average.		Departure.	
		Current month.	Percentage of normal.	Current month.	Accumulated since Jan. 1.
New England	11	4.56	125	+0.90	− 2.70
Middle Atlantic	15	3.47	109	+0.30	− 0.60
South Atlantic	11	2.88	78	−0.80	− 4.20
Florida Peninsula [1]	9	2.29	85	−0.40	+10.50
East Gulf	11	6.61	147	+2.10	+16.00
West Gulf	10	3.10	91	−0.30	− 5.80
Ohio Valley and Tennessee	14	3.29	97	−0.10	+ 0.70
Lower Lakes	10	1.90	66	−1.00	− 0.20
Upper Lakes	13	1.67	77	−0.50	− 1.60
North Dakota [1]	9	0.60	100	0.00	+ 1.60
Upper Mississippi Valley	15	1.01	56	−0.80	− 3.00
Missouri Valley	12	0.33	32	−0.70	− 4.10
Northern slope	9	0.46	53	−0.40	− 0.10
Middle slope	6	0.34	46	−0.40	− 0.20
Southern slope [1]	8	0.89	90	−0.10	+ 0.40
Southern Plateau [1]	9	0.28	36	−0.50	− 0.60
Middle Plateau [1]	11	0.25	24	−0.80	− 0.30
Northern Plateau [1]	9	1.21	71	−0.50	+ 2.30
North Pacific	7	7.05	89	−0.90	− 2.10
Middle Pacific	7	1.82	42	−2.50	− 6.30
South Pacific	4	0.16	7	−2.00	− 3.40

[1] Regular Weather Bureau and selected cooperative stations.